



# Integrating & Maintaining Sustainable Buildings in the DoD

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**May 9, 2011**



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# Integrating & Maintaining Sustainable Buildings in the DoD

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- **Driving Forces**
- **Green Building Requirements**
- **Challenges**



# Integrating & Maintaining Sustainable Buildings in the DoD

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***DoD's building inventory is the key  
to Federal government sustainability***

***What does that mean, how  
can I make that statement ???***

***Let's first take a look at how the Federal  
government sees sustainability***



# Driving Forces Federal

## ➤ Executive Order 13514

- ◆ President's vision: ... *create clean **energy** economy ... promote **energy** security ... safeguard environment ...*
- ◆ **Centerpiece goal: Reduce GHG emissions** (3 goals)
- ◆ Other goals: High performance bldgs, water efficiency, **energy** efficiency, renewable **energy**, waste reduction, EMS, master planning, sustainable acquisition, electronics stewardship

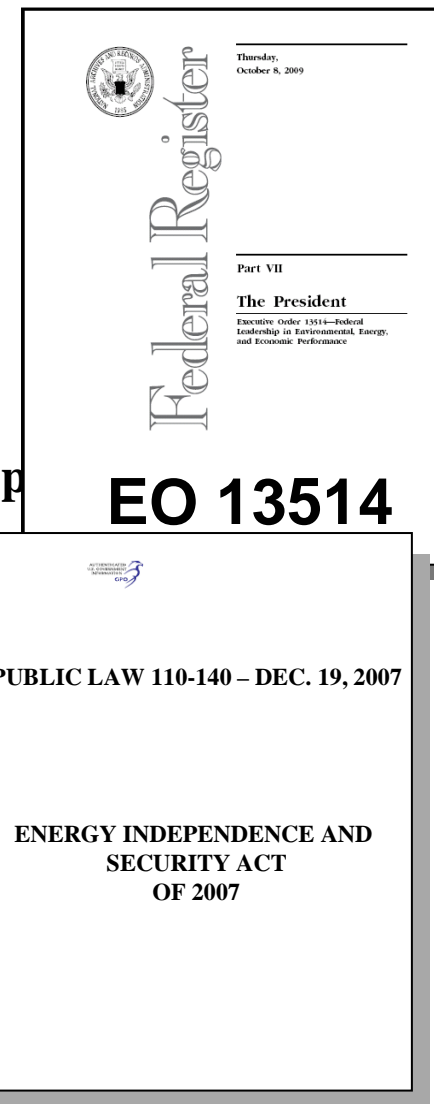
## ➤ **Energy** Independence & Security Act (EISA) of 2007

- ◆ §431 – Reduce **energy** use 30% by 2015 (2005 baseline)
- ◆ §433 – Fossil fuel **energy** use eliminated by 2030

## ➤ **Energy** Policy Act (EPAct) of 2005

- ◆ §109 – Bldg **energy** performance 30% better than ASHRAE
- ◆ §203 – Renewable **energy** targets – 7.5% by FY2013

**GHG emissions reduction and  
energy efficiency are *focus areas***





# FY2010 OMB Scorecard on Sustainability/Energy

## Department of Defense

# DoD's FY 2010 OMB Scorecard

Green Buildings Rating



### Scope 1&2 GHG Emission Reduction Target

Submitted comprehensive inventory as 2008 baseline for Scope 1&2 GHG Reduction Target of 34% by 2020<sup>1</sup>



Score: **GREEN**



### Scope 3 GHG Emission Reduction Target

Submitted comprehensive inventory as 2008 baseline for Scope 3 GHG Reduction Target of 13.5% by 2020<sup>1</sup>



Score: **GREEN**



### Reduction in Energy Intensity

Reduction in energy intensity in goal-subject facilities compared with 2003: 11.2% and not on track



Score: **RED**



### Use of Renewable Energy

Use of renewable energy as a percent of facility electricity use: 11.3% from any renewable source (including thermal)



Score: **YELLOW**



### Reduction in Potable Water Intensity

Reduction in potable water intensity compared with 2007: 12.9% and on track for 26% in 2020



Score: **GREEN**



### Reduction in Fleet Petroleum Use

Reduction in fleet petroleum use compared to 2005: 6.6% and not on track



Score: **RED**



### Green Buildings

Sustainable green buildings:  
0.06% of buildings sustainable  
0.46% GSF of inventory sustainable



Score: **RED**

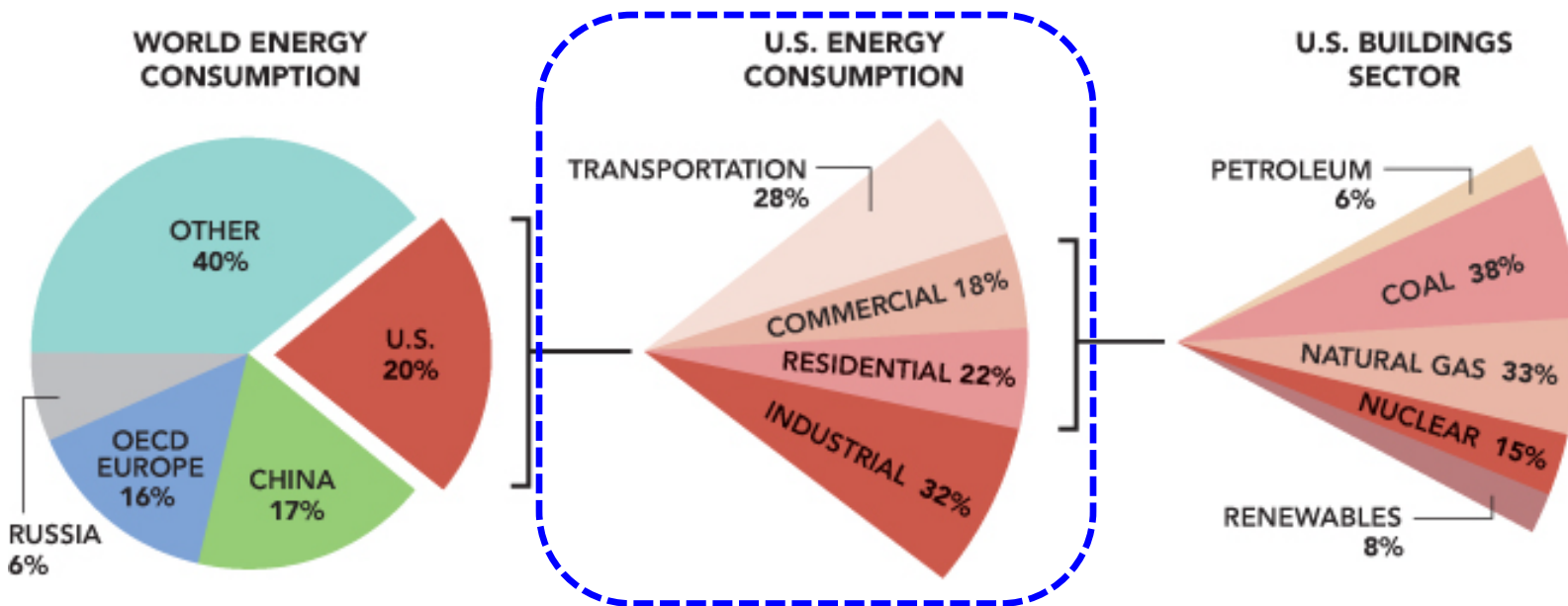
<sup>1</sup> Agency status on achieving GHG metrics in FY2010 will be assessed in July 2011



# Driving Forces

## ➤ U.S. Energy Use – GHG Emissions Relationship

- ◆ Building Sector consumes 40% of all energy in the U.S.
- ◆ Industrial Sector – 32%, Transportation Sector – 28%

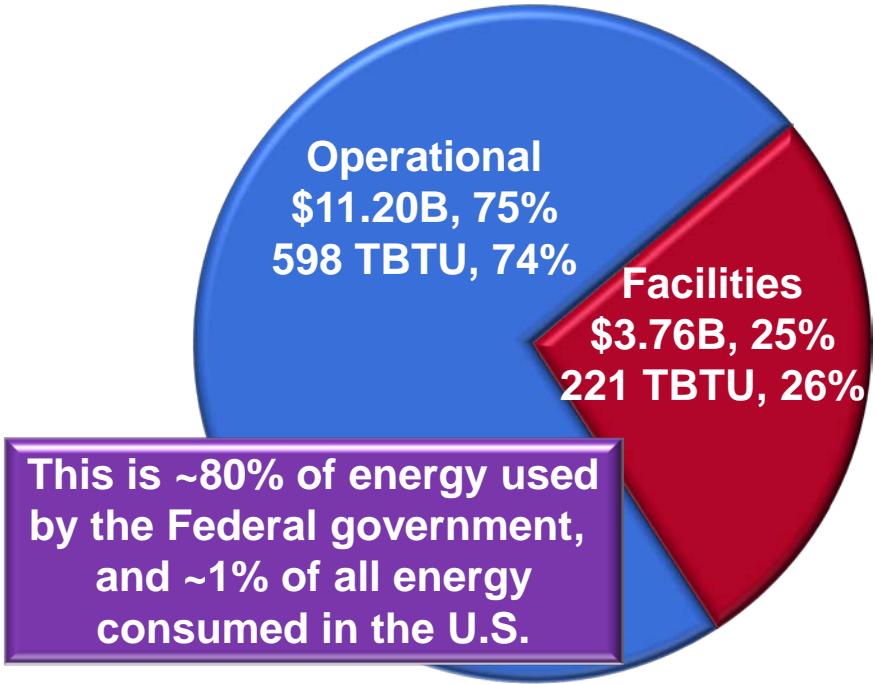


- ◆ Building Sector energy use results in ~54% of U.S. GHG emissions



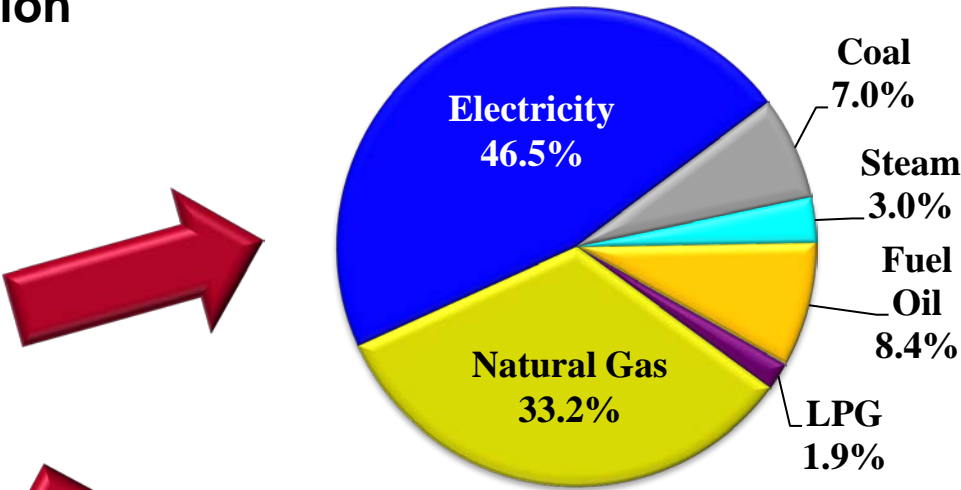
# Driving Forces

## 2010 DoD Overall Energy Consumption

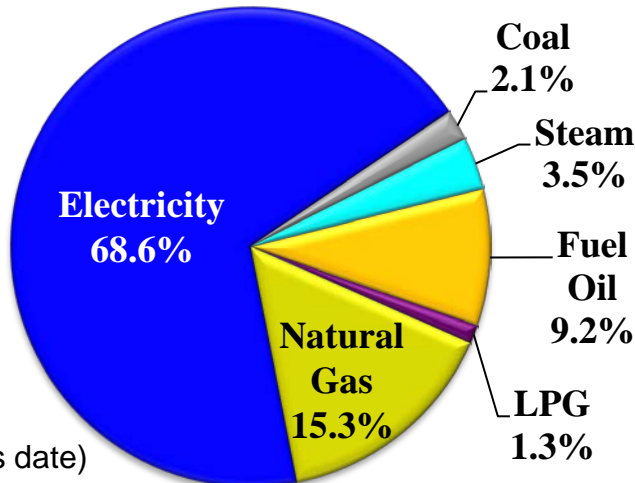


Overall DoD Energy Cost	
\$11.20B	Operational
\$ 3.76B	Facilities
\$ 0.25B	Fleet vehicles
\$15.21B TOTAL	

## Facilities Energy Consumption



## Facilities Energy Cost



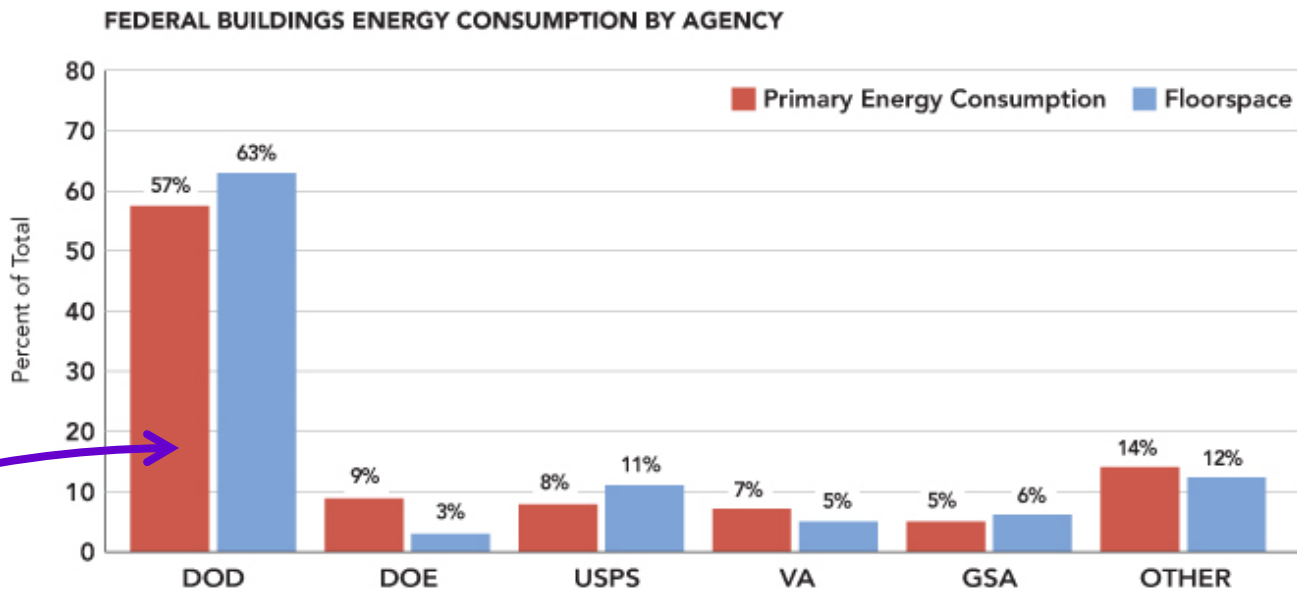
Source: 2010 DoD Annual Energy Management Report (not officially signed out as of this date)





# Driving Forces

- So, DoD uses a lot of energy in its buildings, but how much in comparison with the rest of the Federal government ???



Nearly twice as much as the next 4 largest users combined

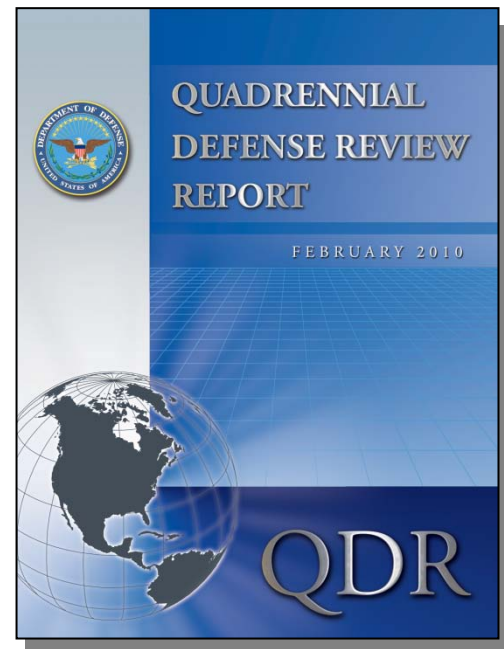
So, DoD's building inventory really IS (arguably) the key to Federal government sustainability



# Driving Forces DoD

## ➤ QDR and Defense Planning Guidance (DPG) define DoD future focus & funding priorities

- ◆ Increase energy security
- ◆ Increase facility energy efficiency
- ◆ Increase water use efficiency
- ◆ Reduce “fully burdened cost of fuel” (FBCF)
  - Key Performance Parameter for energy efficiency



**The QDR sets key priorities for capability development & investment, and communicates SecDef's intent for the next several years**

**The DPG is SecDef's goals, priorities, and objectives, including fiscal constraints for development of budget requirements by the Military Departments & Defense Agencies**



# Driving Forces

## DoD Mission Linkage

### ➤ Sustainable buildings increase *energy security*, enhance operational capability

- ♦ Energy efficient installation + suitable renewable energy generation = less grid dependency = more *energy security*
  - *Energy security* assures warfighter reachback
- ♦ Energy efficient installation + suitable renewable energy generation = reduced energy bill = more \$ available for “tooth”
  - More \$ available for “tooth” = enhanced operational capability

### ➤ Sustainable systems reduce DoD operational risk

- ♦ Low fuel appetite = Fewer convoys; Fewer convoys = Less operational risk
- ♦ *Fully burdened cost of fuel (FBCF)* affects funds available for operations
  - Cost to get fuel to fight; up to \$400/gal
  - Iraq, May 08; 44 tankers, 220Kgal lost to insurgent attacks
- ♦ Energy efficiency Key Performance Parameter will reduce FBCF over time





# Driving Forces

## Federal – DoD Linkage

- **EO 13514** required federal agencies to write a **Strategic Sustainability Performance Plan**
  - ◆ DoD's **SSPP** publicly released August 26, 2010
  - ◆ Updated annually, next update due in June 2011
- **SSPP** consolidates EO, EISA, EPAct rqmts
  - ◆ **SSPP** features 21 performance-based sub-goals
  - ◆ Most goals were tracked pre-EO 13514
- **DoD Sustainable Buildings Policy, Oct 2010**
  - ◆ Build to LEED-Silver (or equivalent) *and* Guiding Principles
  - ◆ 40% of LEED points from energy/water



Department of Defense  
Strategic Sustainability Performance Plan

FY 2010

Public Version  
26 August 2010



OFFICE OF THE UNDER SECRETARY OF DEFENSE  
3000 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3000

OCT 25 2010

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY  
(INSTALLATIONS, ENERGY AND ENVIRONMENT)  
ASSISTANT SECRETARY OF THE NAVY (ENERGY,  
INSTALLATIONS AND ENVIRONMENT)  
ASSISTANT SECRETARY OF THE AIR FORCE (INSTALLATIONS,  
ENVIRONMENT AND LOGISTICS)  
DIRECTORS OF DEFENSE AGENCIES  
DIRECTOR, WASHINGTON HEADQUARTERS SERVICES

SUBJECT: Department of Defense Sustainable Buildings Policy

It is DoD policy to build, operate, maintain, reuse, demolish or deconstruct DoD buildings in a sustainable manner, as outlined by DoDI 4170.11 and Unified Facilities Criteria 4-030-01. This memo establishes supplementary Department policy on sustainable buildings and specifies DoD Component actions necessary for compliance. Specifically:

- (1) All new building design and construction shall conform to the guiding principles in the High Performance and Sustainable Buildings MOU (attached). Also, DoD Components will design and build, and certify as appropriate, all new construction projects, at a minimum, to the Silver level of the Leadership in Energy and Environmental Design (LEED) green building rating system (or equal). Beginning in FY12 for projects in the planning stage, the sum of energy and water efficiency credits shall equal or exceed 40% of the points required for a LEED-Silver (or equal) rating; this highlights the importance of pursuing additional energy- and water-related credits in areas such as cool roofs and day lighting.
- (2) All repair/renovation projects in existing buildings shall also conform to the guiding principles where they apply. The DoD Components will design, execute and certify major repair/renovation projects to be LEED Silver, at a minimum, where appropriate.
- (3) Reduced total cost of ownership is intrinsic to sustainable buildings. The DoD Components shall incorporate life cycle and cost/benefit analysis into design decisions for new construction and renovation/repair projects.

Each DoD Component is responsible to form guidance in support of this policy. My point of contact is Col Bart Barnhart, at (703) 604-1831 and [barnhart.bart@osd.mil](mailto:barnhart.bart@osd.mil).

Dorothy Robyn  
Deputy Under Secretary of Defense  
(Installations & Environment)

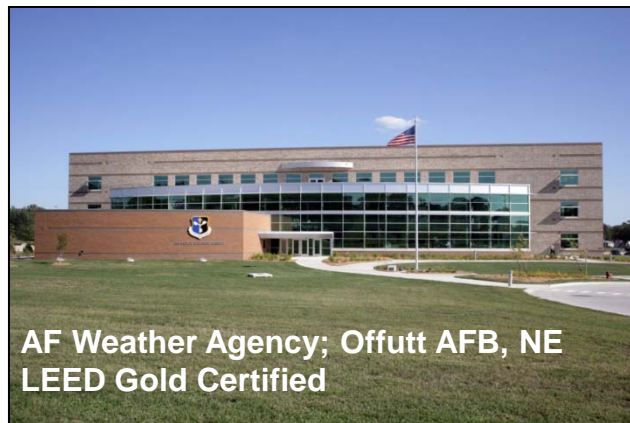
Attachment:  
As stated



# Green Building Requirements

## EO 13514 – driven

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- **Reduce GHG emissions (34% by end of FY20)**
  - ◆ **Reduce facility energy consumption 37.5% by end of FY20 (2003 baseline)**
- **15% of DoD bldgs (>5ksf) conform to **Guiding Principles (GP's)** by FY15**
  - ◆ **75k bldgs x 15% = 11.4k bldgs**
  - ◆ **Bldg must meet all five **GP's** to conform**
  - ◆ **Pushes whole bldg renovations**
- **EO directs continual progress to **GP** conformance for 100% of DoD bldgs**
  - ◆ **307k DoD bldgs – 75% of federal bldg inventory**
- **Beginning in 2020, all newly planned Federal bldgs designed for net-zero energy consumption**







# Green Building Requirements

## The **GP's** and **LEED**

### ➤ The **5 GP's**

- ♦ Employ Integrated Design Principles
- ♦ Optimize Energy Performance
- ♦ Protect and Conserve Water
- ♦ Enhance Indoor Environmental Quality
- ♦ Reduce Environmental Impact of Materials

### ➤ **LEED** categories

- ♦ Sustainable Sites
- ♦ Energy and Atmosphere
- ♦ Water Efficiency
- ♦ Indoor Environmental Quality
- ♦ Materials and Resources

- The **GP's** and **LEED** ... similar, only different
- Meeting **GP's** not enough to earn a **LEED** rating;  
earning a **LEED** rating does not make you **GP** compliant
- DoD will do BOTH (**GP's** & **LEED**) for new construction
  - ♦ Caveat: DoD *does not* set a standard for % of **LEED** certified buildings

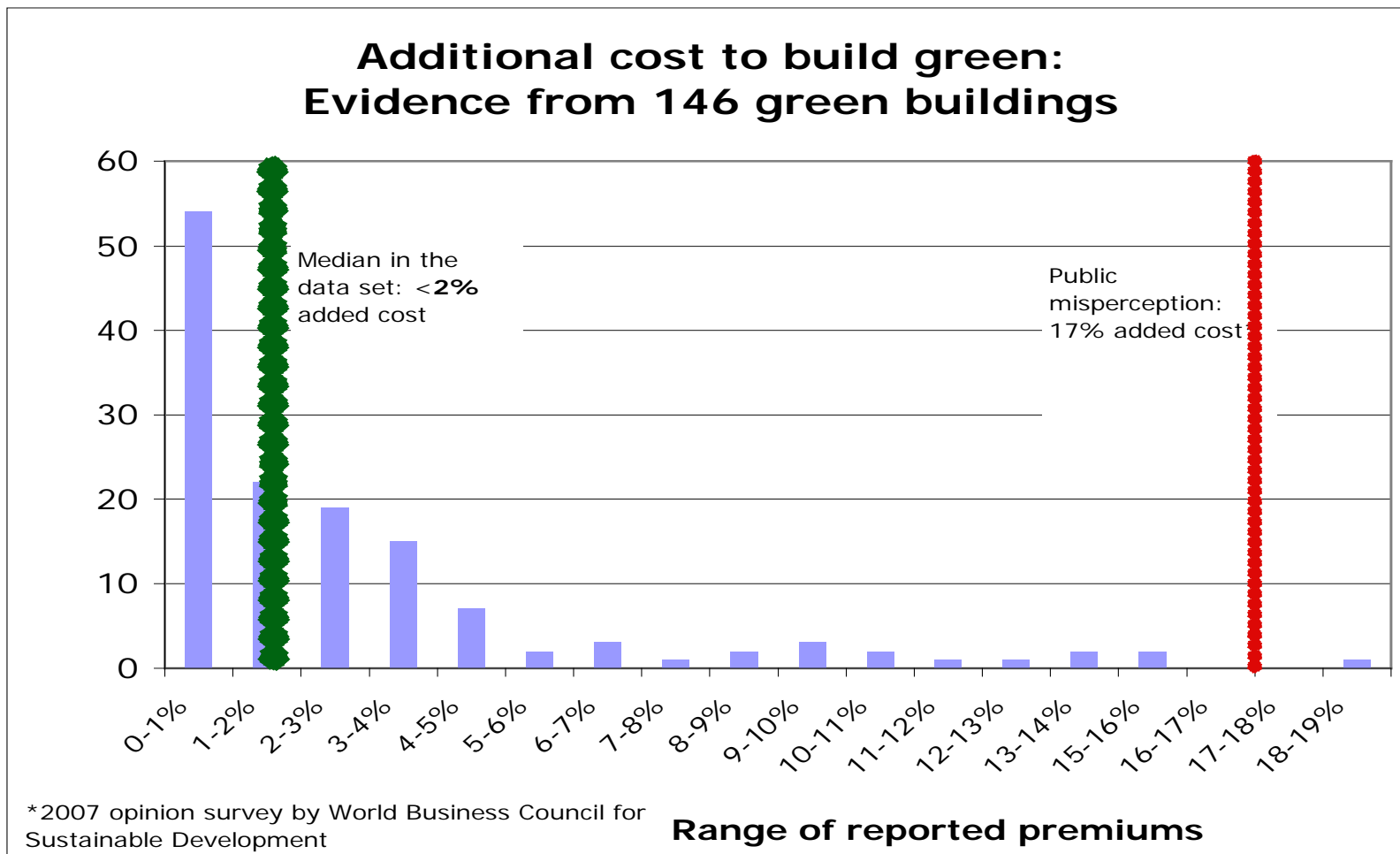
***There is no mention of LEED in Federal guidance!!***



# Challenges

## Cost of Building Green

➤ Is there really a green premium ???





# Challenges

- **Spend a little more up front to save a lot more later**
- **Mil Depts funding sustainment at 80-90% level**
  - ◆ **Tough to operate buildings at designed performance parameters**
- **Training our “sustainability practitioners”**
  - ◆ **Keep building systems at peak performance, or life-cycle cost savings estimates do not happen**
- **Start making Net-Zero energy buildings a reality NOW !!!**

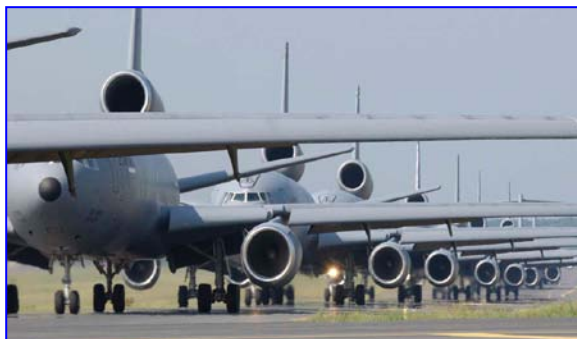






# Questions

# Sustainability



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